

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of the claims in the application.

Listing of Claims:

1 1. (Currently Amended) A power amplifier module
2 comprising:
3 an amplifier; and
4 a control circuit that supplies the amplifier with an
5 idling current that controls the output power of the
6 amplifier,
7 wherein the control circuit receives an input control
8 voltage and is constructed such that the idling current is
9 defined as an exponential function of the input control
10 voltage.

1 2. (Previously Presented) The power amplifier module
2 according to claim 1, wherein the control circuit includes:
3 a circuit that converts the input control voltage into
4 current;
5 a circuit that generates a reference voltage from the
6 current into which the input control voltage has been

7 converted and sets a gradient of voltage that changes in
8 proportion to the input control voltage; and
9 a circuit that converts the voltage into current that
10 changes exponentially relative to the input control
11 voltage.

1 3. (Previously Presented) The power amplifier module
2 according to claim 1, wherein the amplifier is a complex
3 comprising a plurality of stages of amplifiers connected in
4 tandem, and wherein the control circuit is a complex
5 comprising a plurality of circuits that receive the control
6 input voltage in common and supply respective idling
7 currents behaving as aforesaid to the plurality of stages
8 of amplifiers.

1 4. (Previously Presented) The power amplifier module
2 according to claim 3, wherein a common circuit is formed,
3 comprising a circuit that converts the input control
4 voltage into current, a circuit that generates a reference
5 voltage from the current into which the input control
6 voltage has been converted and sets a gradient of voltage
7 that changes in proportion to the input control voltage,
8 and a circuit that converts the voltage into current that

9 changes exponentially relative to the input control
10 voltage, and
11 wherein a plurality of circuits connected to said
12 common circuit supply the respective idling currents to the
13 plurality of stages of amplifiers based on the current that
14 changes exponentially relative to the input control
15 voltage.

1 5. (Previously Presented) A power amplifier module
2 comprising:
3 an amplifier; and
4 a control circuit that supplies the amplifier with an
5 idling current that controls the output power of the
6 amplifier;

7 wherein the control circuit receives an input control
8 voltage and makes the idling current behave so as to
9 exponentially change, relative to the input control
10 voltage,

11 wherein the amplifier is fabricated with GaAs HBTs
12 packaged on a semiconductor integrated circuit including a
13 pair of an input transistor and an output transistor, the
14 input transistor carrying the idling current and forming a

15 current mirror circuit in conjunction with the output
16 transistor, and
17 wherein the control circuit is fabricated with Si
18 transistors or GaAsHBTs packaged on a semiconductor
19 integrated circuit.

1 6. (Previously Presented) A power amplifier module
2 comprising:
3 an amplifier; and
4 a control circuit that supplies the amplifier with an
5 idling current that controls the output power of the
6 amplifier,

7 wherein the control circuit receives an input control
8 voltage and makes the idling current behave so as to
9 exponentially change, relative to the input control
10 voltage,

11 wherein the amplifier is fabricated with SiGeHBTs or
12 Si bipolar transistors packaged on a semiconductor
13 integrated circuit including a pair of an input transistor
14 and an output transistor, the input transistor carrying the
15 idling current and forming a current mirror circuit in
16 conjunction with the output transistor, and

17 wherein the control circuit is fabricated with
18 SiGeHBTs or Si bipolar transistors packaged on a
19 semiconductor integrated circuit.

1 7. (Previously Presented) The power amplifier module
2 according to claim 1,

3 wherein the power amplifier module further includes a
4 circuit that limits the idling current once the input
5 control voltage has reached a predetermined level.

1 8. (Previously Presented) The power amplifier module
2 according to claim 1,

3 wherein the power amplifier module further includes a
4 circuit by which a temperature characteristic of the idling
5 current can be set optionally.

1 9. (Previously Presented) The power amplifier module
2 according to claim 2,

3 wherein the amplifier is a complex comprising a
4 plurality of stages of amplifiers connected in tandem, and

5 wherein the control circuit is a complex comprising a
6 plurality of circuits that receive the control input
7 voltage in common and supply respective idling currents

8 behaving as aforesaid to the plurality of stages of
9 amplifiers.

1 10. (Previously Presented) The power amplifier module
2 according to claim 9, wherein a common circuit is formed,
3 comprising the circuit that converts the input control
4 voltage into current, the circuit that generates a
5 reference voltage from the current into which the input
6 control voltage has been converted and sets a gradient of
7 voltage that changes in proportion to the input control
8 voltage, and the circuit that converts the voltage into the
9 current that changes exponentially relative to the input
10 control voltage,

11 wherein a plurality of circuits connected to said
12 common circuit supply the respective idling currents to the
13 plurality of stages of amplifiers based on the current that
14 changes exponentially relative to the input control
15 voltage.

1 11. (Original) The power amplifier module according
2 to claim 2, wherein the amplifier is fabricated with
3 GaAsHBTs packaged on a semiconductor integrated circuit
4 including a pair of an input transistor and an output

5 transistor, the input transistor carrying the idling
6 current and forming a current mirror circuit in conjunction
7 with the output transistor, and
8 wherein the control circuit is fabricated with Si
9 transistors or GaAsHBTs packaged on a semiconductor
10 integrated circuit.

1 12. (Original) The power amplifier module according
2 to claim 2, wherein the amplifier is fabricated with
3 SiGeHBTs or Si bipolar transistors packaged on a
4 semiconductor integrated circuit including a pair of an
5 input transistor and an output transistor, the input
6 transistor carrying the idling current and forming a
7 current mirror circuit in conjunction with the output
8 transistor, and
9 wherein the control circuit is fabricated with
10 SiGeHBTs or Si bipolar transistors packaged on a
11 semiconductor integrated circuit.

1 13. (Previously Presented) The power amplifier module
2 according to claim 3, wherein the power amplifier module
3 further includes a circuit that limits the idling current

4 once the input control voltage has reached a predetermined
5 level.

1 14. (Original) The power amplifier module according
2 to claim 2, wherein the power amplifier module further
3 includes a circuit by which the temperature characteristic
4 of the idling current can be set optionally.

1 15. (Previously Presented) The power amplifier module
2 according to claim 5,

3 wherein the control circuit includes:

4 a circuit that converts the input control voltage into
5 current;

6 a circuit that generates a reference voltage from the
7 current into which the input control voltage has been
8 converted and sets a gradient of voltage that changes in
9 proportion to the input control voltage; and

10 a circuit that converts the voltage into the idling
11 current that changes exponentially.

1 16. (Previously Presented) The power amplifier module
2 according to claim 6,

3 wherein the control circuit includes:

4 a circuit that converts the input control voltage into
5 current;

6 a circuit that generates a reference voltage from the
7 current into which the input control voltage has been
8 converted and sets a gradient of voltage that changes in
9 proportion to the input control voltage; and

10 a circuit that converts the voltage into the idling
11 current that changes exponentially.
